Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

small number of magnetic data determined by observation, and the mean annual temperature of the place.

January 13, 1848.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

"On the Disruptive Discharge of accumulated Electricity, and the Proximate Cause of Lightning." By Isham Baggs, Esq. Communicated by S. Hunter Christie, Esq., Sec. R.S.

The author proposes to inquire into the principal causes of the violent and disruptive union of opposite electricities which constitutes the electric discharge; and to apply the knowledge thus gained to the explanation of natural phenomena, and the further proof of the identity of frictional and voltaic electricities. He describes two instruments which he employed for the purpose of regulating the discharges of a Leyden jar, or battery, by adjusting with precision the distances between two brass balls, forming a communication between the inner and outer coatings; allowing of their being charged only to a limited degree of intensity, by carrying off all the electricity beyond that extent; and thus guarding the glass from the dangers of fracture from an excess of charge. He is led to the conclusion, that with a given dialectric, such as glass, the limit to the intensity of the charge it can receive varies directly as the cube of its thickness, being in the compound ratio of the resistance it presents to the discharge, which is simply as the thickness, and of the square of the distance of the two charged surfaces, such being the law of electric action.

When a number of insulated Leyden jars, arranged in a consecutive series by connecting the outer coating of each with the inner coating of the next, is charged by means of an electrical machine, the tension of the charge diminishes in each jar as they follow in the series, that of the terminal jar being exceedingly small. On the other hand, when each jar has been charged separately in the same manner and to an equal extent, and then quickly arranged in a series, the jars not touching one another, but the knobs connected with the inner coating of each jar, after the first, being placed at a certain distance from the outer coating of the preceding jar, which in such an arrangement is charged with an electricity of an opposite kind to that of the knob adjacent to it, the author found that the tension of the electricities was greatly augmented, giving rise to violent explosions whenever a discharge occurred. He considers a battery thus constituted as bearing the same relation to a single Leyden jar as the voltaic pile does to a single galvanic circle; and as affording in like manner the means of exalting, to any assignable degree, the electric tension. Adopting the views of Mr. Crosse as to the constitution of a thunder-cloud, namely, that it is formed of a number of concentric zones of electricity, alternately positive and negative,

the central one having the highest intensity, and the tension diminishing in the successive zones surrounding the innermost, till it became inappreciable in the one most remote; the author considers this condition of the cloud to be analogous to that of the battery above described, and the phenomena of the former to receive complete illustration from the experimental results obtained with the latter.

January 20, 1848.

GEORGE RENNIE, Esq., Treasurer, in the Chair.

"On the Heat disengaged during Metallic Substitutions." By Thomas Andrews, M.D., M.R.I.A., Vice-President of Queen's College, Belfast, &c. Communicated by Michael Faraday, Esq., D.C.L., F.R.S. &c.

In a paper which was published in the Philosophical Transactions for 1844, the author deduced from the experimental inquiry there recorded the general law, that when one base displaces another from any of its neutral combinations with an acid, the heat evolved or abstracted is always the same, whatever that acid element may be, provided the bases are the same. Extending a similar inquiry to salts with metallic bases, he establishes, as the result of the investigation of which an account is given in the present paper, the general principle that when an equivalent of one and the same metal replaces another in a solution of any of its salts of the same order, the heat developed is, with the same metals, constantly the same, the expression "of a solution of the same order" being understood to mean a solution in which the same precipitate is produced by the addition of an alkali, or, on one view of the composition of such salts, in which the metal exists in the same state of oxidation. The metallic salts, in the precipitation of which by other metals the evolved heat was ascertained, were those of copper precipitated by zinc, iron or lead; of silver, precipitated by zinc or copper; and of lead, mercury, and platinum precipitated by zinc: and the acid elements were either the sulphuric, hydrochloric, acetic or formic acids. From the last series of experiments the author deduces, that if three metals A, B, and C, be so related that it is capable of displacing B and C from their combinations, and also B capable of displacing C, then the heat developed in the substitution of A for C will be equal to that developed in the substitution of B for C; and a similar rule may be applied to any number of metals similarly related.

January 27, 1848.

GEORGE RENNIE, Esq., Treasurer, in the Chair.

"On Galvanic Currents existing in the Blood." By James Newton Heale, Esq., Licentiate of the Royal College of Physicians, and